	Type	L #	Hits	Search Text	DBs
1	BRS	L1	11545	microfluid$6	US-PGPUB; USPAT
2	BRS	L2	1120	1 and (channel or microchannel) with network	US-PGPUB; USPAT
3	BRS	L3	286	2 and manifold	US-PGPUB; USPAT
4	BRS	L5	48	1 and (mate or mated or mating or integrate or integrated or integrating) same substrate same manifold	US-PGPUB; USPAT
5	BRS	L4	19	2 and (mate or mated or mating or integrate or integrated or integrating) same substrate same manifold	US-PGPUB; USPAT
6	BRS	L7	83	1 and (mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US-PGPUB; USPAT
7	BRS	L6	23	2 and (mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US-PGPUB; USPAT
8	BRS	L8	2340	(mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US-PGPUB; USPAT
9	BRS	L9	712	8 and (polymer$6 or glass or ceramic) same (substrate or body or base)	US-PGPUB; USPAT
10	BRS	L10	517	8 and (polymer$6 or glass or ceramic) with (substrate or body or base)	US-PGPUB; USPAT

	Type	L #	Hits	Search Text	DBs
11	BRS	L11	603	8 and (electrokinetic or electroosmotic or electrophoretic or dielectrophoretic or modulator or gravity or magnetic or wicking)	US-PGPUB; USPAT
12	BRS	L12	206	10 and (electrokinetic or electroosmotic or electrophoretic or dielectrophoretic or modulator or gravity or magnetic or wicking)	US-PGPUB; USPAT

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PASSWORD:
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NEWS 2		"Ask CAS" for self-help around the clock
NEWS 3	JAN 17	Pre-1988 INPI data added to MARPAT
NEWS 4	FEB 21	STN AnaVist, Version 1.1, lets you share your STN AnaVist visualization results
NEWS 5	FEB 22	The IPC thesaurus added to additional patent databases on STN
NEWS 6	FEB 22	Updates in EPFULL; IPC 8 enhancements added
NEWS 7	FEB 27	New STN AnaVist pricing effective March 1, 2006
NEWS 8	MAR 03	Updates in PATDPA; addition of IPC 8 data without attributes
NEWS 9	MAR 22	EMBASE is now updated on a daily basis
NEWS 10	APR 03	New IPC 8 fields and IPC thesaurus added to PATDPAFULL
NEWS 11	APR 03	Bibliographic data updates resume; new IPC 8 fields and IPC thesaurus added in PCTFULL
NEWS 12	APR 04	STN AnaVist $500 visualization usage credit offered
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NEWS 14	APR 12	Improved structure highlighting in FQHIT and QHIT display in MARPAT
NEWS 15	APR 12	Derwent World Patents Index to be reloaded and enhanced during second quarter; strategies may be affected
NEWS 16	MAY 10	CA/CAplus enhanced with 1900-1906 U.S. patent records
NEWS 17	MAY 11	KOREAPAT updates resume
NEWS 18	MAY 19	Derwent World Patents Index to be reloaded and enhanced

NEWS EXPRESS FEBRUARY 15 CURRENT VERSION FOR WINDOWS IS V8.01a,
CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP),
AND CURRENT DISCOVER FILE IS DATED 19 DECEMBER 2005.
V8.0 AND V8.01 USERS CAN OBTAIN THE UPGRADE TO V8.01a AT
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NEWS HOURS	STN Operating Hours Plus Help Desk Availability
NEWS LOGIN	Welcome Banner and News Items
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FULL ESTIMATED COST                                         0.21       0.21

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=> s microfluid?
L1       16103 MICROFLUID?

=> s l1 and ?channel (8w) network
L2         217 L1 AND ?CHANNEL (8W) NETWORK

=> s l2 and manifold
L3           0 L2 AND MANIFOLD

=> s l1 and manifold
L4         125 L1 AND MANIFOLD

=> s l1 and manifold (p) (substrate or body or base or layer) (p) (channel or
microchannel) (s) network
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH
FIELD CODE - 'AND' OPERATOR ASSUMED 'MANIFOLD (P) '
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH
FIELD CODE - 'AND' OPERATOR ASSUMED 'LAYER) (P) '
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH
FIELD CODE - 'AND' OPERATOR ASSUMED 'MANIFOLD (P) '
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH
FIELD CODE - 'AND' OPERATOR ASSUMED 'LAYER) (P) '
L5           0 L1 AND MANIFOLD (P) (SUBSTRATE OR BODY OR BASE OR LAYER) (P)
               (CHANNEL OR MICROCHANNEL) (S) NETWORK

=> s l1 and (integrat? or mat? or connect? or bond?) (s) manifold
   2 FILES SEARCHED...
```

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L6          59 L1 AND (INTEGRAT? OR MAT? OR CONNECT? OR BOND?) (S) MANIFOLD

=>

=>

=> s l1 and (integrat? or mat? or connect? or bond? or interfac?) (s) manifold
   2 FILES SEARCHED...
L7          70 L1 AND (INTEGRAT? OR MAT? OR CONNECT? OR BOND? OR INTERFAC?)
               (S) MANIFOLD

=> s l7 and (channel or microchannel) (s) network
L8           2 L7 AND (CHANNEL OR MICROCHANNEL) (S) NETWORK

=> s l7 and (electrokinetic or electroosmotic or electrophoretic or
dielectrophoretic or modulator or gravity or magnetic or wicking)
L9          14 L7 AND (ELECTROKINETIC OR ELECTROOSMOTIC OR ELECTROPHORETIC OR
               DIELECTROPHORETIC OR MODULATOR OR GRAVITY OR MAGNETIC OR WICKING
              )

=> display l9 1-14 ibib abs

L9   ANSWER 1 OF 14  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:        2006:243521  CAPLUS
TITLE:                   Micellar electrokinetic chromatography of
                         small molecules and proteins on poly(dimethylsiloxane)
                         microfluidic devices
AUTHOR(S):               McDaniel, Kevin J.; Roman, Greg; Culbertson,
                         Christopher
CORPORATE SOURCE:        Texas Southern University, Houston, TX, 77004, USA
SOURCE:                  Abstracts of Papers, 231st ACS National Meeting,
                         Atlanta, GA, United States, March 26-30, 2006 (2006),
                         ANYL-216.  American Chemical Society: Washington, D.
                         C.
                         CODEN: 69HYEC
DOCUMENT TYPE:           Conference; Meeting Abstract; (computer optical disk)
LANGUAGE:                English
AB   Microfluidic devices have several advantages over conventional
     scale chemical anal. instrumentation.  These devices can integrate
     multiple chemical processing steps in a channel manifold so that a
     number of chemical manipulations can be performed either in series or parallel.
     Such systems are also known as micrototal anal. systems (mg-TAS).  Several
     different types of chemical processing and handling steps have been
     demonstrated using μ-TAS including mixing, reactions, filtering,
     preconcn. and sepns.  Several of these processing and handling steps have
     been integrated to form devices capable of performing complete chemical
     analyses.  The choice platform used for fabrication of
     microfluidic devices so far has been by far poly(dimethylsiloxane)
     (PDMS), a hydrophobic elastomer.  This project explains the modification
     of PDMS channel walls using micellaelectrokinetic chromatog.  The micelles
     play a dual role in these devices: they serve both as dynamic surface
     coating and as a psuedostationary phase.  It is the psuedostationary phase
     which enables the separation of hydrophobic and neutral analytes.

L9   ANSWER 2 OF 14  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:        2005:311958  CAPLUS
DOCUMENT NUMBER:         142:424974
TITLE:                   Microchip separations of protein biotoxins using an
                         integrated hand-held device
AUTHOR(S):               Fruetel, Julia A.; Renzi, Ronald F.; VanderNoot,
                         Victoria A.; Stamps, James; Horn, Brent A.; West, Jay
                         A. A.; Ferko, Scott; Crocker, Robert; Bailey,
                         Christopher G.; Arnold, Don; Wiedenman, Boyd; Choi,
                         Wen-Yee; Yee, Daniel; Shokair, Isaac; Hasselbrink,
```

Ernest; Paul, Philip; Rakestraw, David; Padgen, Debbie
CORPORATE SOURCE: Sandia National Laboratories, Livermore, CA, 94551-0969, USA
SOURCE: Electrophoresis (2005), 26(6), 1144-1154
CODEN: ELCTDN; ISSN: 0173-0835
PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA
DOCUMENT TYPE: Journal
LANGUAGE: English

AB We report the development of a hand-held instrument capable of performing two simultaneous microchip sepns. (gel and zone electrophoresis), and demonstrate this instrument for the detection of protein biotoxins. Two orthogonal anal. methods are chosen over a single method in order to improve the probability of pos. identification of the biotoxin in an unknown mixture Sepns. are performed on a single fused-silica wafer containing two separation channels. The chip is housed in a **microfluidic manifold** that utilizes o-ring sealed fittings to enable facile and reproducible fluidic **connection** to the chip. Sample is introduced by syringe injection into a septum-sealed port on the device exterior that connects to a sample loop etched onto the chip. Detection of low nanomolar concns. of fluorescamine-labeled proteins is achieved using a miniaturized laser-induced fluorescence detection module employing two diode lasers, one per separation channel. Independently controlled miniature high-voltage power supplies enable fully programmable **electrokinetic** sample injection and anal. As a demonstration of the portability of this instrument, we evaluated its performance in a laboratory field test at the Defense Science and Technol. Laboratory with a series of biotoxin variants. The two separation methods cleanly distinguish between members of a biotoxin test set. Anal. of naturally occurring variants of ricin and two closely related staphylococcal enterotoxins indicates the two methods can be used to readily identify ricin in its different forms and can discriminate between two enterotoxin isoforms.

REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:1061590 CAPLUS
DOCUMENT NUMBER: 142:151109
TITLE: Hand-Held Microanalytical Instrument for Chip-Based **Electrophoretic** Separations of Proteins
AUTHOR(S): Renzi, Ronald F.; Stamps, James; Horn, Brent A.; Ferko, Scott; VanderNoot, Victoria A.; West, Jay A. A.; Crocker, Robert; Wiedenman, Boyd; Yee, Daniel; Fruetel, Julia A.
CORPORATE SOURCE: Sandia National Laboratories, Livermore, CA, 94551-0969, USA
SOURCE: Analytical Chemistry (2005), 77(2), 435-441
CODEN: ANCHAM; ISSN: 0003-2700
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The design, fabrication, and demonstration of a hand-held microchip-based anal. instrument for detection and identification of proteins and other biomols. are reported. The overall system, referred to as μChemLab, has a modular design that provides for reliability and flexibility and that facilitates rapid assembly, fluid and microchip replacement, troubleshooting, and sample anal. Components include two independent separation modules that incorporate interchangeable fluid cartridges, a 2-cm-square fused-silica **microfluidic** chip, and a miniature laser-induced fluorescence detection module. A custom O-ring sealed **manifold** plate **connects** chip access ports to a fluids cartridge and a syringe injection port and provides sample introduction and world-to-chip **interface**. Other novel **microfluidic connectors** include capillary needle fittings for fluidic

connection between septum-sealed fluid reservoirs and the **manifold** housing the chip, enabling rapid chip priming and fluids replacement. Programmable high-voltage power supplies provide bidirectional currents up to 100 μA at 5000 V, enabling real-time current and voltage monitoring and facilitating troubleshooting and methods development. Laser-induced fluorescence detection allows picomolar (10-11 M) detection sensitivity of fluorescent dyes and nanomolar sensitivity (10-9 M) for fluorescamine-labeled proteins. Migration time reproducibility was significantly improved when sepns. were performed under constant current control (0.5-1%) as compared to constant voltage control (2-8%).

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 4 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:104896 CAPLUS

DOCUMENT NUMBER: 134:375494

TITLE: Design of an interface to allow **microfluidic** electrophoresis chips to drink from the fire hose of the external environment

AUTHOR(S): Attiya, Said; Jemere, Abebaw B.; Tang, Thompson; Fitzpatrick, Glen; Seiler, Kurt; Chiem, Nghia; Harrison, D. Jed

CORPORATE SOURCE: Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2, Can.

SOURCE: Electrophoresis (2001), 22(2), 318-327
CODEN: ELCTDN; ISSN: 0173-0835

PUBLISHER: Wiley-VCH Verlag GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB An interface design is presented that facilitates automated sample introduction into an **electrokinetic** microchip, without perturbing the liqs. within the **microfluidic** device. The design uses an **interface** flow channel with a volume flow resistance that is 0.54- 4.1 + 106 times lower than the volume flow resistance of the **electrokinetic** fluid **manifold** used for mixing, reaction, separation, and anal. A channel, 300 μm deep, 1 mm wide and 15-20 mm long, was etched in glass substrates to create the sample introduction channel (SIC) for a manifold of **electrokinetic** flow channels at 10-13 μm depth and 36-275 μm width. Volume flow rates of up to 1 mL/min were pumped through the SIC without perturbing the solns. within the **electrokinetic** channel manifold. Calcns. support this observation, suggesting a leakage flow to **electroosmotic** flow ratio of 0.1:1% in the **electrokinetic** channels, arising from 66-700 μL/min pressure-driven flow rates in the SIC. Peak heights for capillary electrophoresis sepns. in the **electrokinetic** flow manifold showed no dependence on whether the SIC pump was on or off. On-chip mixing, reaction and separation of anti-ovalbumin and ovalbumin could be performed with good quant. results, independent of the SIC pump operation. Reproducibility of injection performance, estimated from peak height variations, ranged from 1.5-4%, depending upon the device design and the sample composition

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:603279 CAPLUS

DOCUMENT NUMBER: 127:222291

TITLE: **Electroosmotic** Pumping of Organic Solvents and Reagents in Microfabricated Reactor Chips

AUTHOR(S): Salimi-Moosavi, Hossein; Tang, Thompson; Harrison, D. Jed

CORPORATE SOURCE: Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2, Can.

SOURCE: Journal of the American Chemical Society (1997), 119(37), 8716-8717
CODEN: JACSAT; ISSN: 0002-7863
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB **Electroosmotic** pumping of organic solvents and reaction of reagents within a network of integrated channels on a glass microchip is demonstrated. An organic phase reaction of p-nitrobenzenediazonium tetrafluoroborate (AZO) and N,N-dimethylaniline (DMA) in methanol or acetonitrile solvents, with 0.001 M tetraethylammonium perchlorate as electrolyte, demonstrated the on-chip reaction. The overall mobility of AZO was 9 and 5 + 10-5 cm2/V·s in acetonitrile and methanol, resp. The reaction products were determined on chip by absorbance at 488 nm, with peak absorbances in acetonitrile and methanol of 0.18 ± 0.01 (standard deviation) and 0.277 ± 0.008, resp. Utilizing **electroosmotic** pumping to drive and control fluid flow within a **manifold** of **integrated** capillaries simplifies the fabrication of **microfluidic** devices in that no pumps or values are needed. More complex microreactor designs based on this demonstrated **electroosmotic** fluid control could find application in highly automated synthesizers for combinatorial chemical

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 6 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(12):2021 COMPENDEX
TITLE: Sol-gel modified poly(dimethylsiloxane) **microfluidic** devices with high **electroosmotic** mobilities and hydrophilic channel wall characteristics.
AUTHOR: Roman, Gregory T. (Kansas State University 111 Willard Hall, Manhattan, KS 66506, United States); Hlaus, Tyler; Bass, Kevin J.; Seelhammer, Todd G.; Culbertson, Christopher T.
SOURCE: Analytical Chemistry v 77 n 5 Mar 1 2005 2005.p 1414-1422
CODEN: ANCHAM ISSN: 0003-2700
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2005(12):2021 COMPENDEX

AB Using a sol-gel method, we have fabricated poly(dimethylsiloxane) (PDMS) microchips with SiO2 particles homogeneously distributed within the PDMS polymer **matrix**. These particles are [similar to]10 nm in diameter. To fabricate such devices, PDMS (Sylgard 184) was cast against SU-8 molds. After curing, the chips were carefully removed from the mold and sealed against flat, cured pieces of PDMS to form enclosed channel **manifolds**. These chips were then solvated in tetraethyl orthosilicate (TEOS), causing them to expand. Subsequently, the chips were placed in an aqueous solution containing 2.8% ethylamine and heated to form nanometer-sized SiO2 particles within the cross-linked PDMS polymer. The water contact angle for the PDMS-SiO2 chips was [similar to]90.2deg compared to a water contact angle for Sylgard 184 of [similar to]108.5deg . More importantly, the SiO2 modified PDMS chips showed no rhodamine B absorption after 4 h, indicating a substantially more hydrophilic and nonabsorptive surface than native PDMS. Initial **electroosmotic** mobilities (EOM) of (8.3 +- 0.2) * 10-4 cm 2/(V*s) (RSD = 2.6% (RSD is relative standard deviation); n = 10) were measured. This value was approximately twice that of native Sylgard 184 PDMS chips (4.21 +- 0.09) * 10-4 cm2/ (V*s) (RSD = 2.2%; n = 10) and 55% greater than glass chips (5.3 +- 0.4) * 10-4 cm2/(V*s) (RSD = 7.7%; n = 5). After 60 days of dry storage, the EOM was (7.6 +- 0.3) * 10 -4 cm2/(V*s) (RSD = 3.9%; n = 3),

a decrease of only 8% below that of the initially measured value. Separations performed on these devices generated 80 000-100 000 theoretical plates in 6-14 s for both tetramethylrhodamine succidimidyl ester and fluorescein-5-isothiocyanate derivatized amino acids. The separation distance was 3.5 cm. Plots of peak variance vs analyte migration times gave diffusion coefficients which indicate that the separation efficiencies are within 15% of the diffusion limit. $CPY 2005 American Chemical Society. 81 Refs.

L9 ANSWER 7 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(5):3437 COMPENDEX
TITLE: Hand-held microanalytical instrument for chip-based **electrophoretic** separations of proteins.
AUTHOR: Renzi, Ronald F. (Sandia National Laboratories, Livermore, CA 94551-0969, United States); Stamps, James; Horn, Brent A.; Ferko, Scott; VanderNoot, Victoria A.; West, Jay A. A.; Cracker, Robert; Wiedenman, Boyd; Yee, Daniel; Fruetel, Julia A.
SOURCE: Analytical Chemistry v 77 n 2 Jan 15 2005 2005.p 435-441
CODEN: ANCHAM ISSN: 0003-2700
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2005(5):3437 COMPENDEX
AB The design, fabrication, and demonstration of a hand-held microchip-based analytical instrument for detection and identification of proteins and other biomolecules are reported. The overall system, referred to as muChemLab, has a modular design that provides for reliability and flexibility and that facilitates rapid assembly, fluid and microchip replacement, troubleshooting, and sample analysis. Components include two independent separation modules that incorporate interchangeable fluid cartridges, a 2-cm-square fused-silica **microfluidic** chip, and a miniature laser-induced fluorescence detection module. A custom O-ring sealed **manifold** plate **connects** chip access ports to a fluids cartridge and a syringe injection port and provides sample introduction and world-to-chip **interface**. Other novel **microfluidic connectors** include capillary needle fittings for fluidic **connection** between septum-sealed fluid reservoirs and the **manifold** housing the chip, enabling rapid chip priming and fluids replacement Programmable high-voltage power supplies provide bidirectional currents up to 100 muA at 5000 V, enabling real-time current and voltage monitoring and facilitating troubleshooting and methods development. Laser-induced fluorescence detection allows picomolar (10-11 M) detection sensitivity of fluorescent dyes and nanomolar sensitivity (10 -9 M) for fluorescamine-labeled proteins. Migration time reproducibility was significantly improved when separations were performed under constant current control (0.5-1%) as compared to constant voltage control (2-8%). 18 Refs.

L9 ANSWER 8 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(5):2784 COMPENDEX
TITLE: Low-dispersion **electrokinetic** flows for expanded separation channels in **microfluidic** systems: Multiple faceted interfaces.
AUTHOR: Fiechtner, Gregory J. (Sandia National Laboratories MS 9951, Livermore, CA 94550, United States); Cummings, Eric B.
SOURCE: Journal of Chromatography A v 1027 n 1-2 Feb 20 2004 2004.p 245-257
CODEN: JCRAEY ISSN: 0021-9673
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2004(5):2784 COMPENDEX
AB A novel methodology to design on-chip conduction channels is presented for expansion of low-dispersion separation channels. Designs are examined using two-dimensional numerical solutions of the Laplace equation with a Monte Carlo technique to model diffusion. The design technique relies on trigonometric relations that apply for ideal **electrokinetic** flows. Flows are rotated and stretched along the abrupt **interface** between adjacent regions having differing specific permeability. Multiple **interfaces** can be placed in series along a channel. The resulting channels can be expanded to extreme widths while minimizing dispersion of injected analyte bands. These channels can provide a long path length for line-of-sight optical absorption measurements. Expanded sections can be reduced to enable point detection at the exit section of the channel. Designed to be shallow, these channels have extreme aspect ratios in the wide section, greatly increasing the surface-to-volume ratio to increase heat removal and decrease unwanted pressure-driven flow. The use of multiple **interfaces** is demonstrated by considering several three-**interface** designs. Faceted flow splitters can be constructed to divide channels into any number of exit channels while minimizing dispersion. The resulting **manifolds** can be used to construct medians for structural support in wide, shallow channels. $CPY 2003 Elsevier B.V. All rights reserved. 104 Refs.

L9 ANSWER 9 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2003(14):2742 COMPENDEX
TITLE: Monolithic membrane valves and diaphragm pumps for practical large-scale integration into glass **microfluidic** devices.
AUTHOR: Grover, William H. (Department of Chemistry University of California, Berkeley, CA 94720, United States); Skelley, Alison M.; Liu, Chung N.; Lagally, Eric T.; Mathies, Richard A.
SOURCE: Sensors and Actuators, B: Chemical v 89 n 3 Apr 1 2003 2003.p 315-323
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2003
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2003(14):2742 COMPENDEX
AB Monolithic elastomer membrane valves and diaphragm pumps suitable for large-scale **integration** into glass **microfluidic** analysis devices are fabricated and characterized. Valves and pumps are fabricated by sandwiching an elastomer membrane between etched glass fluidic channel and **manifold** wafers. A three-layer valve and pump design features simple non-thermal device **bonding** and a hybrid glass-PDMS fluidic channel; a four-layer structure includes a glass fluidic system with minimal fluid-elastomer contact for improved chemical and biochemical compatibility. The pneumatically actuated valves have <10 nl dead volumes, can be fabricated in dense arrays, and can be addressed in parallel via an **integrated manifold**. The membrane valves provide flow rates up to 380 nl/s at 30 kPa driving pressure and seal reliably against fluid pressures as high as 75 kPa. The diaphragm pumps are self-priming, pump from a few nanoliters to a few microliters per cycle at overall rates from 1 to over 100 nl/s, and can reliably pump against 42 kPa pressure heads. These valves and pumps provide a facile and reliable **integrated** technology for fluid manipulation in complex glass **microfluidic** and **electrophoretic** analysis devices. $CPY 2003 Elsevier Science B.V. All rights reserved. 41 Refs.

L9 ANSWER 10 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2001(44):5733 COMPENDEX

TITLE: ISHMAEL: In-situ sample handling modular analytical experimental laboratory.
AUTHOR: Bearman, G.H. (Jet Propulsion Laboratory California Institute of Technology MS 306-336, Pasadena, CA 91109, United States); Kossakovski, D.A.
MEETING TITLE: 2001 IEEE Aerospace Conference.
MEETING ORGANIZER: IEEE
MEETING LOCATION: Big Sky, MT, United States
MEETING DATE: 10 Mar 2001-17 Mar 2001
SOURCE: IEEE Aerospace Conference Proceedings v 1 2001.p 1291-1298, (IEEE cat n 00TH8542)
ISSN: 1095-323X
PUBLICATION YEAR: 2001
MEETING NUMBER: 58534
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2001(44):5733 COMPENDEX
AB In-Situ instruments are an integral part of mission designs for exploration of planetary surfaces. A technology gap exists today between sample acquisition and sample analysis tools. **Integrated** science payload packages need an **integrated** sample handling system. One approach is to transport and manipulate samples from a few microns up to [similar to]100 microns in diameter by a carrier fluid contained in **microfluidic manifold** of channels. We are developing a set of modular, reconfigurable, rapid prototyping components for sample manipulation. This set will consist of passive and active components. The passive components are easily stackable in three dimensions and can be built into complex distribution geometries to service many instruments. The active components will allow for sample sorting, gating and immobilization. We will use **dielectrophoretic** technology to manipulate particles in liquid flow. In addition to simply handling the sample we can also perform certain science tasks, such as dielectric spectrosco py or microscopic analysis of caged particles. 14 Refs.

L9 ANSWER 11 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2000(16):3523 COMPENDEX
TITLE: Meso-scale electro-magnetically actuated normally closed valve realized on LTCC tapes.
AUTHOR: Gongora-Rubio, Mario (Inst de Pesquisas Tecnologicas, Sao Paulo, Braz); Sola-Laguna, Luis; Smith, Michael; Santiago-Aviles, Jorge J.
MEETING TITLE: Proceedings of the 1999 Microfluidic Devices and Systems II.
MEETING ORGANIZER: SPIE
MEETING LOCATION: Santa Clara, CA, USA
MEETING DATE: 20 Sep 1999-21 Sep 1999
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3877 1999.p 230-239
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 1999
MEETING NUMBER: 56254
DOCUMENT TYPE: Journal
TREATMENT CODE: General Review
LANGUAGE: English
AN 2000(16):3523 COMPENDEX
AB Sensors and actuators with promising characteristics in aggressive environments and high temperatures have been developed using low temperature co-fired ceramic tape technology.We would like to report our work on an electro-magnetically actuated normally closed valve.This is a hybrid device which utilizes a purely LTCC tape electro-magnet and fluid flow **manifold**, combined with an anisotropically etched silicon rectangular planar spring, and a high energy product SmCo mini-permanent magnet.Device dimensions are in the meso (intermediate) range with the

smallest features (fluid conduit in the **manifold**) of 400 mu m and the largest (the actuating coil) of 15 mm.All parts of the electromagnet and the fluid flow channels were machined from DuPont 951 series, alumina based LTCC tapes utilizing either a numerically controlled milling machine, a puncher or an isotropic etching technique involving the glassy binder of a partially sintered LTCC tape.Two versions of this device have been fabricated.The first one, a hybrid, and an all ceramic (LTCC) valve.The hybrid device, currently under evaluation, consists of five layers of planar spiral coils, **connected** as to preserve the **magnetic** field direction.The total coil resistance is high (120 Ohms) and thermal considerations limits the current to 150 mA.Using a 900 Gauss SmCo magnet (1 mm diameter) we obtained 200 micrometers deflection of the rectangular planar spring with no hydraulic load.The best results so far are with the hybrid valve consisting of a silicon 30 micro-meter thick rectangular planar spring with a polysiloxane sealing element. (Author abstract) 11 Refs.

L9 ANSWER 12 OF 14 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2003:7690069 INSPEC
DOCUMENT NUMBER: B2003-08-2575F-075
TITLE: Monolithic membrane valves and diaphragm pumps for practical large-scale integration into glass **microfluidic** devices
AUTHOR: Grover, W.H.; Skelley, A.M.; (Dept. of Chem., California Univ., Berkeley, CA, USA), Liu, C.N.; Lagally, E.T.; Mathies, R.A.
SOURCE: Sensors and Actuators B (Chemical) (1 April 2003), vol.B89, no.3, p. 317-25, 41 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20030401)B89:3L.317:MMVD;1-#
Price: 0925-4005/03/$30.00
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2003:7690069 INSPEC DN B2003-08-2575F-075
AB Monolithic elastomer membrane valves and diaphragm pumps suitable for large-scale **integration** into glass **microfluidic** analysis devices are fabricated and characterized. Valves and pumps are fabricated by sandwiching an elastomer membrane between etched glass fluidic channel and **manifold** wafers. A three-layer valve and pump design features simple non-thermal device **bonding** and a hybrid glass-PDMS fluidic channel; a four-layer structure includes a glass fluidic system with minimal fluid-elastomer contact for improved chemical and biochemical compatibility. The pneumatically actuated valves have <10 nl dead volumes, can be fabricated in dense arrays, and can be addressed in parallel via an integrated **manifold**. **The** membrane valves provide flow rates up to 380 nl/s at 30 kPa driving pressure and seal reliably against fluid pressures as high as 75 kPa. The diaphragm pumps are self-priming, pump from a few nanoliters to a few microliters per cycle at overall rates from 1 to over 100 nl/s, and can reliably pump against 42 kPa pressure heads. These valves and pumps provide a facile and reliable integrated **technology** for fluid manipulation in complex glass microfluidic **and** electrophoretic **analysis** devices

L9 ANSWER 13 OF 14 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7140436 INSPEC
DOCUMENT NUMBER: B2002-02-7820-002
TITLE: Automated ultrasonic particle processing microsystem
AUTHOR: Sparey-Taylor, G.J.; Lewis, C.; Chapper, E.; (Lab. for Appl. Microsystems, Univ. of Wales Coll. of Cardiff, UK), Schiller, P.; Kern, P.; Barrow, D.A.;

Cefai, J.J.
SOURCE: Proceedings of the SPIE - The International Society for Optical Engineering (2001), vol.4236, p. 107-14, 15 refs.
CODEN: PSISDG, ISSN: 0277-786X
SICI: 0277-786X(2001)4236L.107:AUPP;1-O
Price: 0277-786X/01/$15.00
Published by: SPIE-Int. Soc. Opt. Eng, USA
Conference: Smart Electronics and MEMS II, Melbourne, Vic., Australia, 13-15 Dec. 2000
Sponsor(s): SPIE; Dept. Defence; State Govern. Victoria
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English
AN 2002:7140436 INSPEC DN B2002-02-7820-002
AB The use of ultrasonic technologies to trap and filter desired particulates from a suspending media has been well documented to date. Recent advancements in microsystems and micro-fluidic technology have enabled the design of a miniaturised ultrasonic particle separation unit. The automated microsystem. enables contact-less microprocessing operations to be conducted on small volumes of fluid suspensions in remote environments. Furthermore, the protocol for particle separation is simplified and reduces the need for operator handling. The microfabricated ultrasonic separator sub-system is combined with micro-fluidic components (valves, pumps, flow sensors) **manifold** systems and surface mount **interface** electronics to monitor and control the system's function. The operational function of the system utilises two reservoirs; (i) a pre-process reservoir containing crude sample extract, and (ii) a second reservoir holding wash media. During operation, a crude sample is channelled into the membrane-less filter system and manipulated by ultrasonic sound waves. Wash media is subsequently pumped into the filter, replacing or diluting the support media of the original sample. The sample is then removed, when desired, into a post-processing reservoir. The system has been developed for space micro-**gravity** operations and other configurations are applicable to other terrestrial processing applications

L9 ANSWER 14 OF 14 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:7055850 INSPEC
DOCUMENT NUMBER: A2001-21-9555-018; C2001-11-3380E-002
TITLE: ISHMAEL: in-situ sample handling modular analytical experimental laboratory [for planetary surface exploration]
AUTHOR: Bearman, G.H.; (Jet Propulsion Lab., California Inst. of Technol., Pasadena, CA, USA), Kossakovski, D.A.
SOURCE: 2001 IEEE Aerospace Conference Proceedings (Cat. No.01TH8542), vol.1, 2001, p. 1/291-8 vol.1 of 7 vol. xxii+3688 pp., 14 refs.
ISBN: 0 7803 6599 2
Price: 0 7803 6599 2/2001/$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 2001 IEEE Aerospace Conference Proceedings, Big Sky, MT, USA, 10-17 March 2001
Sponsor(s): IEEE Aerosp.; Electron. Syst. Soc
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Application; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2001:7055850 INSPEC DN A2001-21-9555-018; C2001-11-3380E-002
AB In-situ instruments are an integral part of mission designs for exploration of planetary surfaces. A technology gap exists today between sample acquisition and sample analysis tools. **Integrated**

science payload packages need an **integrated** sample handling system. One approach is to transport and manipulate samples from a few microns up to 100 microns in diameter by a carrier fluid contained in **microfluidic manifold** of channels. We are developing a set of modular, reconfigurable, rapid prototyping components for sample manipulation. This set will consist of passive and active components. The passive components are easily stackable in three dimensions and can be built into complex distribution geometries to service many instruments. The active components will allow for sample sorting, gating and immobilization. We will use **dielectrophoretic** technology to manipulate particles in liquid flow. In addition to simply handling the sample we can also perform certain science tasks, such as dielectric spectroscopy or microscopic analysis of caged particles